Grade 9-12 Unpacked Advanced Math Standards – Geometry

9-12.G.1.1.A. Students are able to **justify** properties of geometric figures.

Webb Level: 3
Bloom: Evaluation

Verbs Defined:
Justify: Explaining

Key terms defined:
Properties: set of mathematical rules, definitions, postulates and theorems
Geometric Figures: any two or three dimensional shape

Teacher Speak:
Students are able to justify (explain) properties of geometric figures.

Student Speak:

- Given a property of a geometric figure:
  - I can explain why a statement is true.
  - If a statement is false, I can provide a counterexample. (An example showing why something is false.)
- I can write direct and indirect proofs for geometric shapes.

9-12.G.1.2A.Students are able to **determine** the values of the sine, cosine, and tangent ratios of right triangles.

Webb Level: 1
Bloom: Application

Verbs Defined:
Determine: find

Key terms defined:
Sine: In a right triangle, it is the ratio of the opposite leg to the hypotenuse.
Cosine: In a right triangle, it is the ratio of the adjacent leg to the hypotenuse.
Tangent: In a right triangle, it is the ratio of the opposite leg to the adjacent leg.
Ratio: A quotient of two numbers or like quantities.

Teacher Speak:
Students are able to determine (find) the values of the sine, cosine, and tangent ratios of right triangles.

Student Speak:

- Given any two sides of a right triangle, I can find the ratios for sine, cosine and tangent.
- Given any two parts of a right triangle, I can find all of the missing parts.
- I can use sine, cosine and tangent ratios to solve application problems that involve right triangles.

9-12.G.1.3A. Students are able to **apply** properties associated with circles.

Webb Level: 2
Bloom: Application

Verbs Defined:
Apply: Use

Teacher Speak:
Students are able to apply properties associated with circles.

Student Speak:

- I can state the similarities and differences between a chord and a diameter.
- Given the arc measures, I can find the measures of a central angle, an inscribed angle, the angle inside a circle formed by two chords, and the angle outside the circle formed by a combination of secants and/or tangents.
- I can find the measure of the angle formed by the tangent and radius.
- From given values, I can find the missing parts of chords, secants, and tangents.

9-12.G.1.4A. Students are able to **use** formulas for surface area and volume to **solve** problems involving three-dimensional figures.

Webb Level: 1
Bloom: Analysis

Verbs Defined:
Use: apply
Solve: solve

Key terms defined:
Surface area: the area of the exterior of any solid object
Volume: the number cubes that are contained within any solid object
Three-Dimensional Figures: prisms, pyramids, cones, spheres and cylinders

Teacher Speak:
Students are able to use (apply) formulas for surface area and volume to solve problems involving three-dimensional figures.

Student Speak:

- Given the appropriate formulas, I can find the surface area or volume of any solid object or a combination of solid objects.
- Given the surface area or volume of any solid object, I can find the key missing parts.

9-12.G.2.1A. Students are able to **use** Cartesian coordinates to **verify** geometric properties.

Webb Level: 2
Bloom: Synthesis

Verbs Defined:
Use: Apply
Verify: Show

Key terms defined:
Cartesian coordinates: x-y plane.
Geometric properties: Set of mathematical rules, definitions, postulates and theorems.

Teacher Speak:
Students are able to use (apply) Cartesian coordinates to verify (show)geometric properties.

Student Speak:
I can use apply Cartesian Coordinate System to show the geometric properties including:

- Midpoint
- Two shapes congruent and similar.
- Special segments in a triangle (median, altitude, angle bisector, cicumcenter, incenter, orthocenter, centroid).
- The relationships of all quadrilaterals.